

Determinants of bank credit in Ghana: A bounds-testing cointegration approach

GIDEON BAKO^{a,c*}, ISAAC ATTAH ACHEAMPONG^b AND MUAZU IBRAHIM^a

^a Wits Business School, University of the Witwatersrand, Johannesburg, South Africa

^b Department of Business Administration, Presbyterian University College, Ghana

^c Department of Accounting and Finance, Garden City University College, Kumasi, Ghana

* Corresponding author: gboako@gmail.com

Abstract

Using the Autoregressive Distributed Lag (ARDL) framework, this paper examines the relevant factors influencing allocation of bank credit to the private sector in the Ghanaian economy for the period 1970 to 2011. The results show that broad money supply, bank assets, real lending rate, and bank deposits are significant determinants of bank credit in both the short and long-run. Inflation also exerts significant positive impact only in the short-run. The study infers the lack of successive governments' commitment to pursue policies that boost the supply of credit to the private sector. Our findings further reveal that increases in deposits mobilization by banks does not necessarily translate into supply of credit to the private sector. A plausible deduction from the findings is that reduced government's domestic borrowing, lower cost of borrowing, and lower central bank reserve requirements for commercial banks in Ghana are needed to stimulate higher lending and credit demand.

Keywords: Bank credit; ARDL cointegration; Real lending rate; Bank deposit; Ghana.

1. Introduction

As a business grows, it requires more capital to fund its operational activities. However, many firms find it difficult to arrange for both short-term and long-term capital for such purposes. Not only do firms find it difficult to raise funds of various forms, but also the decision to settle for debt or equity financing presents serious challenges. The trade-off theory of capital structure recognizes that firms want to enjoy the benefits of lower costs of borrowing (Myers, 1977). From this, it is expected that firms enjoying high profits create additional debt-servicing capacity and have more taxable income to shield and therefore operate on higher borrowing levels. An alternative view to the trade-off theory is the pecking order theory, which argues that firms prefer to employ internal financing (operational cash flow); and where external financing is required, preference is given to debt over equity (López-Gracia and Sogorb-Mira, 2008). Credit from financial institutions like banks is a key source of finance among the major external sources for a business. Literature has shown that the availability of bank credit plays a crucial role in boosting economic growth, especially in emerging markets (Imran and Nishat, 2013) and developing countries of which Ghana is not an exception.

Undoubtedly, Ghana's banking sector has experienced enviable improvements albeit with some challenges. From 20 in 2005, the number of registered banks in Ghana had increased to 27 by December 2013.¹ This improvement was partly on account of improved financial deepening and loose monetary conditions. The increase in the number of banks also reflected a surge in the number of foreign banks owing to financial liberalization policies. For instance, in 1988 there were only two foreign banks in Ghana and by 2007, out of the 23 banks, 11 were foreign-owned (Saka *et al.*, 2012). By 2013, out of 27 banks, 14 (representing about 54%) were foreign-majority-owned (Ecobank, 2013).

It is imperative to note that these financial intermediaries source credit from the central bank and other outlets, and convert them into loanable funds to the private sector. Credit to the private sector serves as an important mechanism for financial development and growth. The McKinnon (1973) and Shaw (1973) models advocate for financial liberalization in accelerating economic development and growth. They argue that financial liberalization improves the rate of economic growth by raising efficiency in financial intermediation subject to financial discipline (Acheampong, 2013). While individuals borrow at specified interest rates, the McKinnon (1973) and Shaw (1973) model posits four (4) channels through which interest rate ceilings distort economic growth:

(i) bias in favour of current consumption and against future consumption leading to reduction in savings below the socially optimal level; (ii) engagement in relatively low-yielding investments; (iii) propensity of bank borrowers' willingness to obtain credits at low interest rates to undertake capital intensive projects; and (iv) the reluctance of low income entrepreneurs to borrow at the higher market clearing interest rates (Fry,1978).

Traditionally, most banks have relied on subjective judgment to assess the credit risk of corporate borrowers. Essentially, bankers use information on various borrower characteristics – such as reputation, leverage, volatility of earnings, and collateral – in deciding whether or not to grant loans. This is directly related to the theory of cream-skimming where an entity provides a product or a service to only the high-value or low-cost customers of that product or service. In the banking sector for instance, this happens when information about borrower quality and default rate are asymmetric, compelling banks to screen and monitor prospective borrowers.

With the boom-bust cycles experienced by some emerging markets before and after the 2008/2009 global financial crisis, investigating the determinants of bank credit has attracted the attention of many researchers. The case of Ghana is interesting to study. The banking sector over the past decade has seen appreciable number of new entrants coupled with an improvement in performance. However, this improvement does not translate into higher credit. For instance, domestic credit provided to the private sector as a share of GDP declined from 15.8% in 2008 to 15.5% in 2009. It further declined from the 15.5% to 14.3% in 2011 down from 14.5% in 2010. Ghana's 2011 private sector credit compares with 24.1% for Mozambique, 37.2% for Kenya and 91.4% for Mauritius. These generally confirm the narrowness of Ghana's financial sector.

Kwakye (2012) reports that, while the numbers of depositors in Ghana ranged from 77,904 to 616,178, the number of loan customers ranged from 988 to 25,398 suggesting that majority of the depositors do not have access to loans. The issue of private sector credit unavailability and the rather higher cost of the little credit dispensed to the private sector have mostly become the concern of the financial press in Ghana. The natural question is, at the macro level, what factors determine banks' credit supply to the private sector? As this paper discusses later, few studies (see for example, Shijaku and Kalluci, 2013; Fase, 1995) have assessed the determinants of bank credit with mixed and inconclusive results. Studies pertaining to Ghana are extremely scanty necessitating further research efforts. Amidu (2006) is notable. By employing

the ordinary least squares (OLS) techniques, the author examines the linkage between monetary policy and banks' lending behavior over the period 1998–2004. Results from the study suggest that economic activities and money supply significantly drive lending while inflation and prime rate do not matter in banks' lending behavior. However, apart from its inability to predict short run factors influencing bank credit, the use of OLS produces biased results especially when the time dimension is short.

This paper thus aims at bridging these gaps in literature by critically investigating the short and long run drivers of bank credit in Ghana. It makes two key contributions to literature. First, to the best of our knowledge, it presents a relatively pioneering work that examines the determinants of bank credit in Ghana. Apart from this, our paper models both the demand and supply factors influencing bank credit in a single equation over a longer time period. Results from the autoregressive distributed lag (ARDL) framework reveal that irrespective of the time horizon, broad money supply, bank assets, real lending rate, and bank deposits are significant determinants of bank credit. Inflation also exerts significant positive impact but only in the short-run. Further evidence show that increases in deposits mobilization by banks does not necessarily translate into supply of credit to the private sector.

The rest of the paper is as follows: Section 2 presents the institutional framework of the Ghanaian financial system. Section 3 analyses the theoretical underpinnings. Section 4 reviews the empirical literature and makes some hypothesis. Section 5 outlines the data and research design. Section 6 presents the results, and section 7 concludes the paper.

2. Institutional framework of the Ghanaian financial system

Ghana's financial system has gone through significant transformation since independence. Undoubtedly, it has over the past few decades moved from interventionist to more liberalized financial sector policy regime. Prior to this, the financial sector was heavily state-owned. Protectionist measures including fixed exchange rate regime was instituted resulting in huge debts to state-owned enterprises, massive non-performing loans and a fragile central bank (Isshaq and Bokpin, 2012). The direct government control constituted knee-jerk approaches as these countered positive gains from the financial sector and the economy as a whole. For instance, Aryeetey *et al.*, (2000) argue that state-owned banks – Ghana Commercial Bank (established in 1953), National Investment Bank (established in 1963), Agricultural Development Bank (established in 1965)

and Bank for Housing and Construction (established in 1973) were directed by government through the central bank to offer credit to the “unproductive sectors” of the economy using various policy interventions including but not limited to interest rates, selective credit controls and ceilings. These undeniably weakened the financial sector and consequently discouraged investment, savings, and dragged growth. The 1983 Economic Recovery Programme (ERP) was subsequently adopted with the hope of turning the economy towards a growth trajectory.

The Financial Sector Adjustment Programme (FINSAP) component of the ERP introduced major reforms to the banking sector. In particular, the fixed exchange rate system was abandoned in favor of “managed” floating regime and new laws which allow for the establishment of Non-Bank Financial Institutions (NBFIs) were instituted. In response to the institutionalization of FINSAP in 1988, non-performing banks and assets were restructured to become viable and profitable. The FINSAP was also accompanied with a number of policy instruments including right price setting, abolishing direct controls and credit rationing, some degree of privatization (including banks) and development of capital markets (Bawumia, 2010).

Whether measured by assets or customer base, banks as a group, form the largest component of the financial system. However, following the contractionary monetary policy in 2001, financial deepening proxies such as domestic credit to the private sector have largely remained around 11% of GDP, relatively low compared to Sub-Saharan Africa’s (SSA) average of 15.2%. Total assets to GDP ratio decreased from 44% in 2000 to 38% in 2001. As a consequence, out of the residual resources, the banking sector could only lend about 25%, 9% and 8.5% credit to the manufacturing sector, commerce and finance, and services respectively. Needful to note that although the agricultural sector accounted for 36% of GDP, the agricultural, forestry and fishing sectors received at most 10% of total bank credit. Asset quality of banks’ loan portfolio deteriorated and non-performing loans for instance increased from 16.2% in 2000 to 28.6% of total loans in 2001 and 2002 and marginally decreased to 24.4% in 2003 (Buchs and Mathisen, 2005).

TABLE 1: FINANCIAL SECTOR DEVELOPMENT INDICATORS IN GHANA (2000-2013)

Year	Broad money supply (% of GDP)	Domestic credit to private sector (% of GDP)	Domestic credit to private sector by banks (% of GDP)	Domestic credit provided by financial sector (% of GDP)
2000	28.17	13.97	13.82	39.30
2001	31.45	11.88	11.75	35.13
2002	34.11	12.15	12.00	34.59
2003	31.05	12.49	12.39	26.92
2004	32.72	13.17	13.06	31.43
2005	32.11	15.54	15.43	30.84
2006	23.26	11.09	11.02	21.10
2007	25.72	14.49	14.42	22.86
2008	27.46	15.88	15.83	27.90
2009	28.25	15.66	15.54	28.70
2010	29.62	15.29	14.58	28.37
2011	30.55	15.05	14.38	27.48
2012	30.51	15.72	14.81	31.48
2013	29.11	16.99	16.00	34.75
Average (2000-2013)	29.58	14.24	13.93	30.06

Source: World Bank (2014)

Table 1 shows an overview of Ghana's financial development over a 14-year period. During this period, domestic credit provided by the financial sector averaged 30.06% compared to 29.58% for broad money supply. The mean domestic credit provided to the private sector was 14.24%. Of this, banks provided about 13.93% of the domestic credit with the highest percentage of credit granted in 2013.

As a result of the central bank's response to monetary tightening, bank credit to the private sector and public institutions in Ghana has been moderated for some time. For instance, in 2008, deposit money bank's credit witnessed a jump of 43.9% growth compared with 64.6% growth in 2007. In real terms, deposit money bank's credit to the private sector dropped to 25.4% in 2008 compared with 41.8% in 2007, with indigenous enterprises accounting for the sizeable share of 67.6% of the total outstanding credit, followed by 21.5% and 9.2%

for household and foreign enterprises respectively (Bank of Ghana, 2008). The trend appears to be the norm in current periods. In the 2013 fiscal year, deposit money bank's credit stance to the private sector and public institutions showed general tightening for all credit types. The pace of the annual growth in private sector credit over a 12-month period from October 2012 to October 2013 slowed to 25.0%. Bank of Ghana records indicate that during this period, most credits from banks were advanced to the private sector (a share of 89.7%, marginally up from 89.3% recorded in October 2012). Real growth of credit to the private sector in October 2013 was 10.5%, down from 30.5% during the corresponding period in 2012 (Bank of Ghana, 2013). Sectorial distribution of the flow of credit to the private sector over the 12-month period showed increased concentration in services, commerce and finance, construction and electricity, gas and water sectors (Bank of Ghana, 2013).

The IMF's update on Global Financial Stability Report of October 2013 identified increased risks to financial stability in emerging markets on account of tighter external financial conditions and weaker domestic economic fundamentals. Thus, emerging economies' financial environments continue to be volatile hurting investors' confidence. Despite this development, Ghana's banking sector remains strong, liquid and solvent, but worsening macroeconomic indicators presents systemic risks to the financial sector (Bank of Ghana, 2013).

There has been relatively slight decrease in demand for credit in Ghana during the last two decades causing a decline in loan request for inventories and working capital as well as for debt. The central bank attributes this to tighter terms on loans to corporate bodies. Bank's mortgages have tightened through higher collateral requirements and increase in margins on riskier loans. Similarly, households' access to consumer credit and other lending has seen sharp decreases, on account of higher collateral requirement and margins on riskier loans (Bank of Ghana, 2013).

3. Theoretical underpinnings

Theoretically, this study draws from the bank lending channel of monetary transmission which emphasizes on the potential intensification effects that may be generated by the banking sector, largely through the impact of monetary policy on credit supply to bank-dependent borrowers (Kashyap and Stein, 1995; Stein, 1998; Walsh, 2003).

Bernanke and Blinder's (1988) seminal work on bank lending channel suggests that the imperfect substitutability between bonds and loans increases monetary policy shocks relative to the traditional money (or interest rate) channel. Bernanke and Blinder (1988) further show that relaxing the assumption of perfect substitutability of loans and other debt instruments gives rise to a separate macroeconomic role of credit in an otherwise IS-LM model. However, Hurlin and Kierzenkowsk (2002) argue that the bank lending channel makes monetary policy more restrictive (expansionary) than in a standard IS-LM model on account of the independent effect emanating from the asset side of the banking sector, which decreases (increases) the loan supply to borrowers.

Undoubtedly, bank lending channel has proven useful in differentiating the "lending view" and the "credit rationing". For instance, Kashyap and Stein (1995) opine that the lending view relates to the relative magnitude of changes in the demand for and supply of credit in response to policy tightening. Going by the lending view, the amount of new credit supplied should decline and loan rates should proportionally increase relative to the market rates when policy is tightened. As a corollary, the magnitude of loan supply shifts would relatively be larger than the credit demand shifts. However, the credit rationing advocates that, while the volume of new loans would decline in response to policy tightening, bank loan rates would proportionally increase but by less than the market rates.

The central theme of the transmission mechanism via the bank lending channel is that monetary policy has a direct impact on deposits and that deposits by far constitute the supply of loanable funds thus driving bank lending behaviour. This view essentially suggests that tight monetary policy is assumed to solely deplete deposits thus reducing lending. Disyatat (2010) however questions the validity of the conceptual framework underpinning the bank lending channel and argues that policy-induced variation in deposits is misplaced. He argues that banks can issue credit up to a certain multiple of its own capital, dictated either by regulation or market discipline. Thus, within this constriction, the growth of banks' credit supply is influenced by the demand for and supply of loans by banks.

It is imperative to note that the bank lending channel sheds light on the relationship between monetary policy and overall banking system by linking the latter with credit supply. But beyond the supply side, demand factors by far influence bank lending. Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) modify the real business cycle models with informational asymmetries in credit markets. The result of the asymmetric information is that, firms and

households are constrained and can only borrow when they offer collateral, so that their borrowing capacity depends on their net worth. Because borrowers' net worth is procyclical, the borrowing capacity of firms and households increases in economic upswings and decreases in down swings.

4. Empirical review of related literature

Generally, bank credit to private sector is driven by micro and macroeconomic factors. While the microeconomic factors are bank and individual-specific where credit is advanced based on individual traits, the macroeconomic factors influencing bank credit relate to macroeconomic fundamentals underlying the overall economy. Thus, banks' credit supply depends on their financial standing (Balazs *et al.*, 2006), regulatory framework (Cotarelli *et al.*, 2003), monetary policy (Pruteanu-Podpeira, 2007) and the macroeconomic environment (Sacerdoti, 2005; Baum *et al.*, 2009). In the empirical literature, credit aggregates are usually assumed to be mainly determined by demand (Calza *et al.*, 2001), depending positively on economic activity and negatively on financing costs.

Available literature indicates that over the last two decades, most of the fastest growing economies of the developing nations have experienced lending booms and financial stress (see Ranciere *et al.*, 2003). Out of these economies, countries which relied more on external finance suffered most during the crises era (Kamil and Rai, 2010), and subsequently banks which faced ultimate liquidity stress lost their ability to lend more (Aisen and Franken, 2010). There is also enough evidence to suggest that legal institutions (see La Portal *et al.*, 1998; Demirguc-Kunt and Maksimovic, 1998; Beck *et al.*, 2003), politics (see Rajan and Zingales, 2003) and culture (see Garresten *et al.*, 2004) are macro-level factors that might explain the notable variations in the level of financial development across countries. However, the levels of significance of these factors are yet to be examined (Sharma and Gounder, 2012).

Hoffmann (2001) analyzed the determinants of bank credit to the private non-financial sector in 16 industrialized countries based on a vector autoregressive model. His analysis suggests that property prices are an important determinant of the long-run borrowing capacity of the private sector, which needs to be taken into account to explain the long-run movements of bank lending.

In addition to the macroeconomic drivers of bank credit, Cotarelli *et al.*, (2003) examines the effect of institutional variables on bank credit to private sector over a panel of 27 industrialized and non-transitional developing economies

spanning 1973–1996. The authors found an inverse relationship between public debt and bank credit to private sector – an evidence of possible crowding-out effect. Further results also show that bank credit rises in response to increases in GDP per capita. However, the effect of inflation is non-linear. In other words, the effect of inflation on bank credit is negative (positive) if the inflation rate is above (below) a certain threshold. Beyond the macroeconomic drivers of credit, higher transparency in accounting standards translates into higher bank credit-to-GDP ratio.

Olokoyo's (2011) study in Nigeria shows that among the macro-level variables, bank credit is significantly induced by exchange rate movements, interest rate and GDP where an increase in these metrics translates into higher loans and advances.

Sharma and Gounder (2012) examined the drivers of bank credit to private sector across six economies using the generalized methods of moments over the period 1982–2009. Results from their estimation show that while lending rate and inflation negatively affect banks' credit growth, deposit and asset size are credit-enhancing. Further results also reveal an increase in credit growth in response to increases in economic growth proxied by GDP. This finding is particularly consistent with Olokoyo (2011).

By employing the vector error correction model, Shijaku and Kullaci (2013) investigate the determinants of bank credit in Albania spanning 2001–2011. Results from their study show that in the long run credit supply is positively influenced by exchange rate, financial intermediation and banks deposits. However, lending to the private sector is constrained by higher public debt (consistent with Cotarelli *et al.*, (2003)) and rising lending rate.

In his empirical examination of the determinants of domestic credit levels in 24 emerging market economies, Gozgor (2013) use a dynamic panel data estimation technique to investigate the short and long run effects of internal demand and external supply factors, external balance, different measures of trade openness, and global uncertainty on domestic credit. The findings show that loose monetary policy in the domestic market, differences between domestic and global lending rates and real trade openness positively contribute to domestic credit levels.

Imran and Nishat (2013) used the ARDL econometric approach to identify the factors that explain the flow of bank credit to businesses in varying financial environments and emerging global challenges from the period 1971–2010.

With the major focus on supply side, their empirical results indicate that foreign liabilities, domestic deposits, economic growth, exchange rate, and monetary conditions are significantly associated with bank credit to the private sector in Pakistan, particularly in the long-run. They however observed that inflation and money market rates do not influence private credit.

Assefa (2014) investigates the determinants of bank credit in Ethiopia using annual data spanning 1978–2011. Results from the study show that in the long run, among others domestic deposits, real lending rate, GDP, inflation and previous year's lending positively influence banks credit. Further results show that in the short run domestic deposits do not matter in credit behaviour of banks suggesting that banks do not immediately lend to the private sector from their deposits. However, money supply exerts negative effect on lending both in the short and long run.

Amidu (2014) examines the micro and macroeconomic determinants of bank lending relying on data of 264 banks across 24 countries in SSA. At the micro level, bank size, growth and efficiency positively influences bank credit. Where banks are heavily concentrated, credit supply is low. However, the level of bank stability, risk adjusted profit and high non-performing loans do not affect bank lending in SSA. At the macro level, Amidu (2014) found a negative nexus between policy-induced interest rate and bank lending suggesting bank credit supply increases when the monetary policy stance is relaxed. This evidence is however inconsistent with Assefa (2014) who found a positive nexus between bank credit and lending rate. Further results from Amidu's (2014) study reveal that the level of economic activity sufficiently affects banks lending behaviour especially in a well reformed financial sector coupled with high bank density.

More recently, Enisan and Oluwafeni (2015) examine the determinants of credit growth in Nigeria using the Engle and Granger error correction model. Findings from the study show that in the long run, bank assets, money supply, cyclical risk premium and inflation positively and significantly influence credit growth while reserve ratio and lending rate negatively affects growth of credit to the private sector. Apart from these, further results reveal that in the short run real GDP per capita adversely affects credit growth. This finding is particularly inconsistent with Sharma and Gounder (2012) who found a positive relationship between credit growth and GDP per capita. Enisan and Oluwafeni (2015) argue that because oil constitutes a major component of GDP, its value added is negligible with low linkages with other sub-sectors and is therefore unable to translate into higher credit growth hence the difference in GDP-lending nexus.

Rabab'ah's (2015) study in Jordan shows that non-performing loans negatively and significantly affects credit supply with size of bank and economic growth positively impacting on lending. Consistent with Imran and Nishat (2013), Rabab'ah's (2015) study found of the effect of inflation and interest rate on bank credit.

From the theoretical and empirical literature, we clearly set out the following two hypotheses to guide this study.

First hypothesis: H_{01} : banks' assets and level of deposit positively affects credit supply; and

Second hypothesis: H_{02} : macroeconomic fundamentals and monetary policy influence the level of bank credit.

5. Data and research design

The paper uses annual time series data covering the period 1970 to 2011 and uses seven independent variables to estimate the determinants of bank credit in Ghana. Apart from data availability, we restrict our sample to this period to allow comparability of our work to existing studies that use the same time period. Data are gleaned from World Development Indicators of the World Bank (2014), Penn World Tables and Global Financial Development Database. *Appendix 1A* provides the data and their respective sources.

Based on economic theory and empirics, the following functional model is specified for the paper:

$$BPC = f(INF, RER, RGDP, RLR, BM, BGD, BDP, D) \quad (1)$$

where BPC = bank credit to the private sector as a percentage of GDP; INF = rate of inflation; RER = real exchange rate; RGDP = real gross domestic product; RLR = real lending rate; BM = broad money supply as a percentage of GDP; BGD = bank assets as a percentage of GDP; BDP = bank deposit as a percentage of GDP; D = Dummy (Proxy for successive governments). D = 1 for 1970-1971; 1980-1981; 1993-2011 represent constitutional regime and D = 0 denotes the unconstitutional period from 1972-1979; 1982-1992. The introduction of the dummy is germane since Ghana had undergone both constitutional and unconstitutional governance regimes during the sample period.

The precise estimable econometric model is formulated as:

$$\ln BPC_t = \beta_0 + \beta_1 \ln INF_t + \beta_2 \ln RER_t + \beta_3 \ln RGDP_t + \beta_4 RLR_t + \beta_5 \ln BM_t + \beta_6 \ln BGD_t + \beta_7 \ln BDP_t + \beta_8 D_t + \varepsilon_t \quad (2)$$

where all variables are as previously defined apart from ε_t which represents the error term, t is the time and represents natural logarithm, θ_0 is the intercept and the β s are the coefficients. All the variables are in natural logarithms except RLR which contained negative values and D .

Several methodologies have been employed to estimate the cointegrating properties among variables. Common among these methodologies are the Johansen (1998) and Johansen-Juselius (1990) cointegration, the residual based approach by Engle and Granger (1987), and the Autoregressive Distributed Lag (ARDL) model by Pesaran and Shin (1995) and Pesaran *et al.*, (1996). The advantages of the ARDL over the conventional cointegration methodologies are that: first, the ARDL assumes all variables to be endogenous. Second, the method is usable regardless of whether the underlying explanatory variables are integrated of order zero or one - I(0), or I(1) or fractionally integrated (Pesaran and Pesaran, 1997). Thirdly, under the ARDL, it is possible for different variables to have different number of lags; and finally, the methodology is applicable to small samples. The assumption about the ARDL bound testing approach is that variables should either be stationary at the levels or first difference. If any of the variables is found to be stationary at the second difference, the process of computing the ARDL F-statistics becomes impracticable. We thus check the stationarity property of the variables by relying on the Phillip-Perron (1988) - PP and Kwiatkowski *et al.*, (1992) - KPSS tests. The null hypothesis of the PP test is that the series contains unit roots while the alternate is that the series is stationary. However, the KPSS test the null hypothesis that the series is stationary against the alternate hypothesis of non-stationary.

In order to examine the long-run equilibrium relationship among the variables and the associated short-run dynamics, we estimate the unrestricted error correction model (UECM) within the ARDL (p, k, q, r, s, t, u, v) bounds testing framework as follows:

$$\begin{aligned} \Delta \ln BCP_t = & \delta_0 + \sum_{i=1}^p \phi_1 \Delta \ln BPC_{t-i} + \sum_{i=0}^k \phi_2 \Delta \ln INF_{t-i} + \sum_{i=0}^q \phi_3 \Delta \ln RER_{t-i} + \sum_{i=0}^r \phi_4 \Delta \ln RGDP_{t-i} + \sum_{i=0}^s \phi_5 \Delta RLR_{t-i} \\ & + \sum_{i=0}^t \phi_6 \Delta \ln BM_{t-i} + \sum_{i=0}^u \phi_7 \Delta \ln BGD P_{t-i} + \sum_{i=0}^v \phi_8 \Delta \ln BDP_{t-i} + \tau D_t + \alpha_1 \ln BPC_{t-1} + \alpha_2 \ln INF_{t-1} + \alpha_3 \ln RER_{t-1} \\ & + \alpha_4 \ln RGDP_{t-1} + \alpha_5 RLR_{t-1} + \alpha_6 \ln BM_{t-1} + \alpha_7 \ln BGD P_{t-1} + \alpha_8 \ln BDP_{t-1} + \varpi ECM_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

where Δ is the difference operator; ϕ_1 through to ϕ_8 and a_1 through to a_8 are the short and long-run coefficients respectively. ECM_{t-1} is the error correction term

measuring the speed of adjustment following a shock to the system; thus linking the short-run deviations to long-run equilibrium.

To investigate the existence of long-run relationship among the variables, we conduct a bound test based on the joint F -statistics test to observe the joint significance of the lagged level variables. To achieve this, the null hypothesis of no cointegration is stated as:

$$H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0 \quad (4)$$

Against the alternative hypothesis,

$$H_1 = \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0 \quad (5)$$

If the computed F -statistics exceeds the upper critical bound, $I(1)$, we accept the alternate hypothesis that the variables are cointegrated in the long-run. There is no cointegration when the computed F -statistics is less than the lower bound critical value $I(0)$. When the computed F -statistics lies between the upper and lower critical bound (i.e. $I(0) \leq F \text{ value} \leq I(0)$), the result is inconclusive.

6. Empirical results and discussion

6.1. Descriptive statistics and Unit Roots

Appendix 1B and Table 2 respectively respectively presents the descriptive statistics and unit root tests of all variables in the study. In *Appendix 1B*, it is observed that all variables posted positive mean values during the sample period except RER. The highest (lowest) mean values of 10.008 (-3.720) are seen with RGDP (RER). In terms of skewness, BDP, BM, BPC, and RLR recorded negative values. All variables show less peakedness except INF and RLR, which show marginal leptokurtic innovations. Again, variables have normal distributions except RLR which also possessed the highest volatility measured by the standard deviation.

TABLE 2: UNIT ROOT RESULTS

Variable	PP		KPSS	
	Constant	Constant + Trend	Constant	Constant + Trend
	<i>LEVEL</i>			
<i>lnBPC</i>	-2.36	-2.35	0.15	0.14
<i>lnINF</i>	-3.88***	-4.55***	0.25	0.13
<i>lnRER</i>	-1.99	0.36	0.79***	0.18**
<i>lnRGDP</i>	3.18	-0.11	0.75***	0.20**
<i>RLR</i>	-2.31	-3.77***	0.54**	0.09
<i>lnBM</i>	-1.42	0.72	0.33	0.14
<i>lnBGDP</i>	-0.92	-1.56	0.35	0.18**
<i>lnBDP</i>	-0.94	-1.43	0.34	0.15**
	<i>FIRST DIFFERENCE</i>			
Δ <i>lnBPC</i>	-6.56***	-6.50***	0.07	0.05
Δ <i>lnINF</i>	-9.60***	-10.86***	0.31	0.13
Δ <i>lnRER</i>	-4.88***	-5.62***	0.43	0.14
Δ <i>lnRGDP</i>	-3.91***	-6.02***	0.69**	0.07
Δ <i>RLR</i>	-10.71***	-10.86***	0.14	0.11
Δ <i>lnBM</i>	-6.33***	-6.28***	0.11	0.08
Δ <i>lnBGDP</i>	-4.26***	-4.46***	0.29	0.11
Δ <i>lnBDP</i>	-5.11***	-5.21***	0.19	0.9

Notes: **(***) denotes stationarity at the 5% (1%) significance level respectively for both the PP and KPSS. Test statistics for both PP and KPSS are computed with simulated critical values from Mackinnon (1996, Table 1) and Kwiatkowski-Phillips-Schmidt-Shin (1992,) respectively. PP and KPSS test bandwidth selection is based on Newey-West.

The PP and KPSS unit root tests are done both in levels and first difference. Each test is estimated first without a trend and second with trend. Results of the unit root tests are presented in Table 2 below. Our results from the PP test suggest that without the trend, only inflation is stationary at levels and by including a trend, only real lending rate and inflation are stationary. However, after first differencing, all the variables become stationary. This holds whether or not we include a trend.

6.2. Bound testing for long-run relationship

The bounds-testing procedure identifies the long-run relationship(s) between BPC and its determinants. Based on the Akaike Information Criterion (AIC)

and Schwarz Criterion (SC) two (2) lags are selected for the bounds-testing of the $I(0)$ and $I(1)$ component specifications. The results of the bounds-testing procedure are reported in Table 3.

TABLE 3: BOUNDS TEST FOR COINTEGRATION RELATIONSHIP

Test Statistics	Value	Level	Critical value bounds of the F-Statistics:	
			Unrestricted Intercept and no Trend	
			$I(0)$	$I(1)$
F-Statistics	5.379657**	1%	3.644	5.464
		5%	2.643	4.130
		10%	2.260	3.534

$$K=7 \quad F_{BPC}(BPC / INF, RER, RGDP, RLR, BM, BGDP, BDP)$$

$$F_{INF}(\cdot) = 4.317361 \quad F_{RER}(\cdot) = 0.486038 \quad F_{RGDP}(\cdot) = 8.191320 \quad F_{RLR}(\cdot) = 9.360296$$

$$F_{BM}(\cdot) = 1.512106 \quad F_{BGDP}(\cdot) = 2.716032 \quad F_{BDP}(\cdot) = 3.769523$$

*Notes: k is the number of the explanatory variables and ** denote 5% level of statistical significance. Critical values are obtained from Narayan (2005).*

The results in Table 3 indicate that the computed F -statistics value of 5.379657 is greater than the upper critical bound at 5% level of significance. This validates the existence of cointegration among the variables when bank credit to the private sector is used as a dependent variable. Since there is a cointegration relationship among the variables, the long-run relationship is estimated by selecting ARDL (1, 2, 0, 0, 2, 0, 2, 1, 1) based on Akaike Information Criterion (AIC). The empirical evidence of the determinants of bank credit is reported in Table 4.

TABLE 4: ESTIMATED LONG-RUN COEFFICIENTS USING THE ARDL APPROACH -
DEPENDENT VARIABLE IS BPC_t

ARDL (1,2,0,0,2,0,2,1,1) selected based on AIC

<i>Regressor</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>T-Ratio</i>
Constant	1.082	1.630	0.664
In INF_t	-0.112	0.022	0.979
In RER_t	0.021	0.022	0.955
In $RGDP_t$	-0.027	0.148	0.184
RLR_t	-0.008	0.003	-2.544**
In BM_t	1.388	0.171	8.103***
In $BGDP_t$	0.179	0.055	3.277***
In BDP_t	-0.710	0.103	-6.878***
In D_t	-0.155	0.050	-3.122***

Notes: ***, **, * denotes significance at the 1%, 5% and 10% levels respectively.

From Table 4 above, the estimated coefficient of the long run relationship indicates that real lending rate (RLR), which proxies monetary policy has a significant negative impact on bank credit to the private sector. Consistent with Sharma and Gounder (2012) and Amidu (2014), the relationship is significant at 5% and indicates that a 1% increase in real lending rate leads to approximately 0.8% decrease in bank credit to the private sector. Similarly, bank deposit as a percentage of GDP (BGDP) also negatively and significantly (at 5% level) affects bank credit to private sector suggesting that increases in real lending rate and bank deposit are likely to trigger a decline in bank credit to the private sector. Although inconsistent with Shijaku and Kalluci (2013), our finding confirms the bank lending channel suggesting that bank credit increases in response to relaxation of monetary policy stance. This result is particularly in sync with Kwakye (2012) and reveals that supply of credit to the private sector does not necessarily increase following increases in availability of disposable resources from deposits.

Consistent with theory, broad money supply – proxy for financial deepening – and bank asset have positive coefficients that are highly significant at the 1% level suggesting that, individually, a percentage increase in these rises banks' provision of credit to private sector. The assets–lending nexus show that lending to the private sector increases as the quality of banks' assets improves. Imran and Nishat (2013) find similar results for the effect of money supply on bank

credit except that in their case the impact was negative. The coefficient of the dummy variable is negative and significant at 1% level. The plausible inference is that policies pursued by successive governments have been somehow inhibitive to credit supply to the private sector. This raises serious implications for governments' priority and modes of making credit available to the private sector. In most instances, government's supply of credit to the private sector in Ghana have been channeled through politically created ad-hoc programmes like the Micro Credit and Small Loans Scheme (MASLOC), Private Sector Initiative Schemes (PSI), Poverty Alleviation Fund (PAF), etc., most of which have ended up as conduits to allocate credit to non-optimal targets and distribute the largesse of the state to political party functionaries; and in most cases, repayment becomes a challenge.

The coefficient of inflation and GDP are negative suggesting that an increase in inflation and economic activities reduces bank credit. However, none of this effect is significant. Further results also show that exchange rate does not affect the determination of long run credit to the private sector. We turn to the short run dynamics based on the ADRL framework.

Based on equation (3), short run dynamic coefficients are estimated and Table 5 presents the results of the estimated error correction model of the determinants of bank credit to the private sector. The error correction term is correctly signed and significant at 1% level, thus confirming the established long-run relationship between bank credit and the explanatory variables. It also explains the fact that the speed of adjustment of the variables hovers around the equilibrium value in a dampening manner.

TABLE 5: RESULTS OF SHORT-RUN DYNAMIC MODEL - DEPENDENT VARIABLE IS BPC_T

ARDL (1,2,0,0,2,0,2,1,1) selected based on AIC			
<i>Regressor</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>T-Ratio</i>
Constant	1.211	1.926	0.675
$\Delta \ln INF_t$	0.056	0.067	0.839
$\Delta \ln INF_{t-1}$	0.118	0.052	2.256**
$\Delta \ln RER_t$	0.026	0.025	1.009
$\Delta \ln RGDP_t$	-0.033	0.177	-0.185
ΔRLR_t	-0.002	0.002	-0.810
ΔRLR_{t-1}	0.006	0.003	2.224**
$\Delta \ln BM_t$	1.668	0.248	6.723***
$\Delta \ln BGDP_t$	0.598	0.136	4.386***
$\Delta \ln BGDP_{t-1}$	0.252	0.110	2.291**
$\Delta \ln BDP_t$	-1.059	0.225	-4.702***
ΔD_t	-0.066	0.063	0.675
ECM_{t-1}	-1.201	0.162	-7.405***
<i>ECM = $\ln BPC + 0.112 \ln INF - 0.021 \ln RER + 0.072 \ln RGDP + 0.008 RLR - 1.388 \ln BM - 0.179 \ln BGDP + 0.711 \ln BDP + 0.155 D - 1.082 C$</i>			
<i>Model Criteria/Goodness of Fit</i>			
R^2	0.873	R^2 -adjusted	0.775
S.E. of regression	0.077	F-stat,F(12,27)	12.596***
AIC	40.003	SBC	24.803
DW-Statistics		RSS	0.129

Notes: ***, ** denotes significance at the 1% and 5% levels respectively.

The results of both Table 4 and Table 5 show some commonalities in the short-run and long-run. However, a few differences exist. For example, real lending rate (RLR) is seen to exert positive effects on bank credit to the private sector at lag 1 but the effect becomes negative in the long run. The reason may be that, as lending rates increase banks release huge volumes of loanable funds in anticipation of higher earnings through interest on loans. Investors are always in need of funds to fuel their projects and so will quickly yield to the call by the banks, sometimes without considering how much they have to pay in terms of interest. Because of the high lending rates it becomes difficult for investors to honour the debt obligations and in order to reduce the volumes of non-performing loans, banks will decrease their supply of credit to investors, hence the negative impact in the long run.

Also, converse to the long run, inflation is seen to have a significant positive impact on the availability of bank credit to the private sector in the short-run. This is contrary to theoretical suggestion that an increase in inflation rate results in macroeconomic unsteadiness and therefore will discourage financial institutions to make credit available to the private sector. However, the plausible interpretation to the reverse finding is that inflation reduces the relative purchasing power of money at hand of investors due to money illusion and the tax of inflation. In order to play it safe, most investors will rather invest their money in short-term money market instruments (such as government Treasuries, etc.) and long-term fixed deposits to earn a sure interest income, however marginal it may be. This increases the volume of loanable funds for disbursement to the private sector by banks in the short run. Despite this, in the long run, due to the theory of the ‘paradox of thrift’, depositors begin to realize reductions in their holdings because the interest income does not commensurate earnings they could get from alternative productive capital investments, *ceteris paribus*. Subsequently, depositors recall their deposits and this has the corollary effect of reducing the volume of loanable funds available to banks to issue as credit to the private sector.

The short run impact of the dummy variable is similar in sign to its impact in the long-run but dissimilar in significance. The rather insignificant negative impact in the short-run relative to the long-run may be indicative of the fact that even though successive governments have not shown much commitment to making credit readily available to the private sector, the effect of their lack of commitment is not registered until some later dates, perhaps when they are out of government.

7. Summary and conclusion

The paper presents analysis on the determinants of bank credit to the private sector in Ghana from 1970–2011 using the bound testing autoregressive distributed lag (ARDL) approach. The results bear out long run relationship among the variables. The study shows that real lending rate, broad money supply, bank asset as a percentage of GDP, bank deposit as a percentage of GDP and successive governments are the factors that significantly affect the issuance of bank credit to the private sector in the long run. Meanwhile, inflation, real exchange rate and real gross domestic product do not show any significant impact on bank credit to the private sector in the long run. In the short run however, inflation, real lending rate, broad money, bank assets as a percentage of GDP, as well as,

bank deposit as a percentage of GDP have significant impacts on the supply of bank credit to the private sector.

Both the short run and long run results have some policy implications. The study of Guo and Stepanyan (2011) shows that stable domestic deposit growth accounts for the resilience of countries to the shocks of the 2008-2009 global financial crises. Similarly, Sharma and Gounder (2012) posit that strengthening the domestic deposit base could be a key to sustained and stable growth of bank credit to private sector. During the last decade, virtually all deposit taking banks in Ghana have embarked on aggressive savings mobilization strategies. However, the significant negative impact of the bank deposit made available as credit to the private sector suggests that even though Ghanaian banks are mobilizing enough funds by way of savings deposit, these funds are not made available as credit to the private sector. This phenomenon occurs partly because government of Ghana has been competing with investors on the loanable funds market over the years through its domestic borrowing stance. For illustration, Ghana's domestic debt at the end of 2013 amounted to GH¢27.7 billion (55.5% of the total debt stock). The increased government borrowing has resulted in an increase in interest rates on the domestic money markets, with the 91-day Treasury bill rate increasing from 9.68% in 2006 to 10.30% at the end of 2011 and 22.8% by March 2014. Due to the relatively riskless nature of government borrowing, banks feel comfortable to lend to the government at the expense of private investors.

In order not to render the positive effect of broad money supply on bank credit to the private sector ineffective, government of Ghana, must revise its policy stance on domestic borrowing to ease access of bank credit to the private sector. Given that real lending rate exerts significant injurious impact on supply of bank credit to the private sector, there is the need for workable policies to handle this. This calls for the Central Bank of Ghana to relax its tightened monetary policy stance, which has shot the monetary policy rate from 12.5% at the end of December 2006 to 18% by February 2014 and 21% in November 2014. Given that domestic deposits constitute the chunk of the liability funding of banks in Ghana, it would be very harrowing for the Central Bank of Ghana to instigate policies that seek to hamper economic and private sector growth since how much an individual deposits at the bank is a function of his/her net income. Also, from 2005 to 2014, the Bank of Ghana has increased its primary reserve requirements of commercial banks from 9% to 11%. The effect of this is that commercial banks will then have reduced holdings in their vault to make

available as credit to the private sector. As such, there is the need for government of Ghana to revise this policy in order to ensure regular availability of credit to the private sector for accelerated economic growth.

We recommend for future studies to consider the following. While this paper examines the influence of macro-level factors on bank credit, we cannot take for granted the crucial influence of information asymmetry on the decision of banks to advance credit. Since banks grant credit with the hope of recouping at least the principal, knowledge of borrower quality is extremely crucial in the level of credit delivery as financial institutions are unlikely to grant credit when borrower quality is doubted. Apart from this, there is also the need to critically examine the microeconomic demand factors influencing bank credit. In particular, beyond the supply factors, it is important to examine how socio-economic traits of individuals affect the decision to demand bank credit. Knowledge of this will guide banks' credit delivery.

Biographical Notes

Dr. Gideon Boako is the Director of Training at the African Finance and Economics Consult and a lecturer at the Kwame Nkrumah University of Science and Technology. He is also an Economist at the Vice President's office. Gideon is the Associate Editor of the *African Review of Economics and Finance Journal* and an editor of the *Ghanaian Journal of Economics (GJE)*. He has decent publications in top-tier peer-reviewed journals such as the *South African Journal of Economics*, *International Review of Financial Analysis*, *Applied Economics Letters*, *Physica A* among others.

Isaac Attah Acheampong holds a Master of Philosophy degree in Economics from the University of Ghana. He has also completed the Professional Part 1 Examinations of the Association of Certified Chartered Accountants (ACCA-UK). He is currently a Part-Time lecturer at the Presbyterian University College, Ghana. Isaac has a strong background in Mathematics and skills in time series, panel data, and financial econometrics; as well as micro and macroeconomics. His research interests include monetary economics, international economics and public finance.

Muazu Ibrahim is a PhD candidate in Finance at Wits Business School, University of the Witwatersrand, South Africa where he is re-examining various themes in the finance-growth nexus with special reference to sub-Saharan Africa. He received his MSc in Development Economics from the School of

Oriental and African Studies (SOAS), University of London, UK. Apart from being the Programme Quality and Impact Assessment Manager of ActionAid Ghana, he is also the Econometrician on a World Bank – funded project in Ghana dubbed ‘Impact assessment of the untrained teacher diploma in basic education (UTDBE) and sample survey of lesson delivery – an evaluation of the UTDBE of the global partnership for education grant (GPEG)’. Muazu is a lecturer at the University for Development Studies (UDS) School of Business and Law, Ghana. His research interests have been on development finance, cash transfers and poverty, time series econometrics, stock markets and economics of corruption. He has published a number of articles in these areas.

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Endnote

The number excludes the Apex and Rural banks since they are not generally included in the monetary survey (Bawumia *et al.*, 2005). See also http://www.bog.gov.gh/privatecontent/Banking_Supervision/LICENSED%20

References

- Acheampong, N. K., (2013). The effects of foreign bank entry on financial performance of domestic-owned banks in Ghana. *The International Journal of Business and Finance Research*, 7:93–104. http://econpapers.repec.org/article/ibfjbfre/v_3a7_3ay_3a2013_3ai_3a3_3ap_3a93-104.htm(Accessed 20 August 2016)
- Aisen, A., and Franken, M., (2010). Bank credit during the 2008 financial crises: a cross-country comparison. *IMF Working Paper* WP/10/47. Available at: <http://www.imf.org/external/pubs/cat/longres.cfm?sk=23645>
- Amidu, M., (2006). The link between monetary policy and banks' lending behaviour: the Ghanaian case. *Banks and Bank Systems*, 1:38-48.
- Amidu, M., (2014). What influences banks' lending in sub-saharan africa? *AERC Research Paper 267* African Economic Research Consortium, Nairobi.
- Aryeetey, E., Nissanke, M., Steel, W.F., (2000). Intervention and liberalization:changing policies and performance in the financial sector. In: Aryeetey,E., Harrigane, J., Nissanke, M. (Eds.), *Economic reforms in Ghana: The Miracle and the Mirage*. James Currey and Woeli Publishers, Oxford.
- Assefa, M. (2014). Determinants of growth in bank credit to the private sector in ethiopia: a supply side approach. *Research Journal of Finance and Accounting*, 5:90-102.
- Balazs, E., Back, P., and Zumer, T. (2006). Private-sector credit in Central & Eastern Europe: New (over) shooting stars? *Working Paper* No. 852. William Davidson Institute.
- Bank of Ghana (2008). Annual Report and Accounts, Accra. Available at: https://www.bog.gov.gh/privatecontent/Publications/Annual_Reports/2008.pdf
- Bank of Ghana (2013). Monetary Policy Committee Quarterly Bulletin. Available at: http://www.bog.gov.gh/index.php?option=com_cont
- Baum, C.F., Caglayan, M. and Ozkan. N. (2009). The second moments matter: The impact of macroeconomic uncertainty on the allocation of loanable funds". *Economics Letters*, 102: 87-89.
- Bawumia, M., (2010). Monetary policy and financial sector reform in Africa: Ghana's experience. Combert Impressions Ghana Ltd., Accra, Ghana.

- Bawumia, M., Belney, F., Ofori, M.E., (2005). The determinants of bank interest spreads in Ghana: an empirical analysis of panel data. *Bank of Ghana Working Paper*, WP/BoG – 2005/09.
- Beck, T., Demirguc-Kunt, A., and Levine, R., (2003). Law and finance: why does legal origin matter? *World Bank Policy Research Working Paper* 2904. Available at: <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9>
- Bernanke, B., and Gertler, M., (1989). Agency costs, net worth, and business fluctuations. *American Economic Review* 79:14-31.
- Bernanke, B., and Blinder, A., (1988). Credit, money and aggregate demand. *American Economic Review: Papers and Proceedings of the One Hundredth Annual Meeting of the American Economic Association*, 78:435-439: Available at: <http://www.jstor.org/stable1181816>
- Buchs, T., and Mathisen, J., (2005). Competition and efficiency in banking: behavioral evidence from Ghana, *International Monetary Fund Working Paper* WP/05/17
- Calza, A., Gartner, C., Sousa, J., (2001). Modeling the demand for loans to the private sector in the Euro area. *European Central Bank Working Paper*, No. 55, ISSN: 1561-0810. Available at: <http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp055.pdf>.
- Cottarelli, C., Ariccia, D.G. and Valdkova, H. I., (2003). Early birds, late risers and sleeping beauties: bank credit growth to the private sector in Central and Eastern Europe and the Balkans. *Journal of Banking and Finance*, 29: 83-104.
- Demirguc-Kunt, A., and Maksimovic, V., (1998). Law, finance, and firm growth. *Journal of Finance*, 56:2107-2137.
- Disyatat, P., (2010). The bank lending channel revisited. *Bank for International Settlements Working Papers* No 297, Monetary and Economic Department.
- Ecobank (2013). Ghanaian banks: heading towards another wave of recapitalization, Middle Africa insight series. *Ecobank Research Division*, France.
- Engle, R. F., and Granger, C. W. J., (1987). Cointegration and error-correction: representation, estimation, and testing. *Econometrica*, 55:251-276.
- Enisan, A. A., and Oluwafemi, O. I., (2015). Determinants of bank credit growth in Nigeria 1980-2010. *European Journal of Sustainable Development*, 4:23-30.

- Fase, M. M. G., (1995). The demand for commercial bank loans and the lending rate. *European Economic Review*, 39: 99-115.
- Fry, M. J., (1978). Money and capital or financial deepening in economic development? *Journal of Money, Credit and Banking*, 10:464-475.
- Garresten, H., Lensink, R., and Sterken, E., (2004). Growth, financial development, societal norms and legal institutions. *Journal of International Financial Markets, Institutions and Money*, 14:165-183.
- Gozgor, G., (2013). Determinants of domestic credit levels in emerging markets: the role of external factors. *Emerging Markets Review*, 18:1-18.
- Guo, K., and Stepanyan, V., (2011). Determinants of bank credit in emerging market economies. *IMF Working Paper*, WP/11/51.
- Hoffman, B., (2001). The determinants of private sector credit in industrialized countries: do property prices matter? *Bank for International Settlements (BIS) Working Papers* No. 108.
- Hurlin, C. and Kierzenkowski, R., (2002). A theoretical and empirical assessment of the bank lending channel and loan market disequilibrium in Poland. *Working Paper 22*, May 2002, National Bank of Poland, Research Department.
- IMF, (2013). Global financial stability report. October 2013. ISSN: 1729-701X. Available at: <http://www.imf.org/external/pubs/ft/gfsr/2013/02/pdf>.
- Imran, K., and Nishat, M., (2013). Determinants of bank credit in Pakistan: a supply side approach. *Economic Modelling*, 35:384-390.
- Isshaq, Z., and Bokpin, G. A., (2012). Expansion and efficiency in banking: evidence from Ghana. *Managerial and Decision Economics*, 33:19-28.
- Johansen, S., (1998). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12:231-254.
- Johansen, S., and Juselius, K., (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics* 52: 169-210.
- Kamil, H., and Rai, K., (2010). The global credit crunch and foreign bank's lending to emerging markets: why did Latin America fare better? *IMF Working Paper Series*, WP/10/102.
- Kashyap, A. and J. Stein (1995). The impact of monetary policy on bank balance sheets. *Carnegie Rochester Conference Series on Public Policy* 42:151-195.

- Kashyap, A., Stein, J., and Wilcox, D., (1995). Monetary policy and credit conditions: evidence from the composition of external finance. *American Economic Review*, 83:78-98.
- Kiyotaki, N., and Moore, J., (1997). Credit cycles. *Journal of Political Economy*, 105:211-248.
- Kwakye, J. K., (2012). Financial intermediation and the cost of credit in Ghana. *Institute of Economic Affairs Monograph No.36*, Accra.
- Kwiatkowski, D., Phillips, P. C. B., Schmidt, P., and Shin, Y., (1992). Testing for the null stationarity against the alternative of a unit root. *Journal of Econometrics* 54:159–178.
- La Porta, R., Lopez-de-Silanes, Shleifer, A., and Vishny, R., (1998). Law and finance. *Journal of Political Economy*, 106:1113-1155.
- Lopéz-Gracia, J and Sogorb-Mira, F. (2008). Testing trade-off and pecking order theories financing smes. *Small Business Economics* 38:117–136.
- Mckinnon, R., (1973). *Money and capital in economic development*. Brookings Institution, Washington D.C.
- Myers, S. C., (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5:147-75.
- Narayan, P. K., (2005). The saving and investment nexus for china: evidence from cointegration tests. *Applied Economics*, 37:1979-1990.
- Olokoyo, F. O. (2011). Determinants of commercial banks' lending behavior in Nigeria. *International Journal of Financial Research*, 2(2), 61-72.
- Pesaran, M. H., and Pesaran, B., (1997). Working with Microfit 4.0 Interactive Econometric Analysis. *Oxford University Press* (ed) ISBN 10: 0192685317/0-19-268531-7.
- Pesaran, M. H., and Shin, Y., (1995). Autoregressive Distributed Lag modeling approach to cointegration analysis. *Department of Applied Economics Working Paper WP 9514*, University of Cambridge.
- Pesaran, M. H., Shin, Y., and Smith, R., (1996). Testing the existence of a long-run relationship. *Department of Applied Economics Working Paper WP 9622*, University of Cambridge.
- Phillip, P. C. B., and Perron, P. (1988). Testing for a unit root in time series regression, *Biometrika*, 75:335–346.
- Pruteanu-Podpiera, A.M. (2007). The role of banks in the Czech monetary policy transmission mechanism. *Economics of Transition*, 15:393-428.

- Rabab'ah, M., (2015). Factors Affecting the Bank Credit: An empirical study on the Jordanian Commercial Banks. *International Journal of Economics and Finance*, 7: 166-178.
- Rajan. R.G., and Zingales, L., (2003). The great reversals: the politics of financial development in the twentieth century. *Journal of Financial Economics*, 69: 5-50.
- Ranciere, R., Tomell, A., and Westermann, F., (2003). Crises and growth: a revaluation. *NBER WP 10073* - www.cepr.org/meets/wkcn/1/1585/papers/ranciere.pdf
- Sacerdoti, E., (2005). Access to bank credit in sub-Saharan Africa: Key issues and reform strategies. *IMF Working Paper* No. 05/166. International Monetary Fund, Washington, D.C.
- Saka, A. N. A., Aboagye, A. Q. Q., and Gemegah, A. (2012). Technical efficiency of the Ghanaian banking industry and the effects of the entry of foreign banks. *Journal of African Business*, 13: 232-243.
- Sharma, P., and Gounder, N., (2012). Determinants of bank credit in small open economies: the case of six pacific island countries. *Discussion Papers-Griffith Business School*, No. 2012-13; ISSN 1836-8123: Available at: <http://dx.doi.org/10.2139/ssrn.2187772>
- Shaw, E., (1973). *Financial deepening in economic development*. New York: Oxford University Press.
- Shijaku, G., and Kalluci, I., (2013). Determinants of bank credit to the private sector: the case of Albania. *Bank of Albania Working Paper*, No. 09(48), pp. 1-36. Available at: <http://www.bankofalbania.org/previewdoc.php?crd=6900&ln=2&uni>
- Stein, J., (1998). An adverse selection model of bank asset and liability management with implications for the transmission of monetary policy. *RAND Journal of Economics*, 29: 466-486.
- Walsh, C.E. (2003). *Monetary Theory and Monetary Policy* (Second Edition), MIT Press, Massachusetts.
- World Bank (2014). *World Development Indicators*, World Bank, Washington DC.

Appendix 1A: Data and sources

VARIABLE	SOURCE
BPC	Global Financial Development Database
RER	Global Financial Development Database
BGDP	Global Financial Development Database
BDP	Global Financial Development Database
BM	World Development Indicators
INF	World Development Indicators
RGDP	Penn World Tables
RLR	Penn World Tables

Appendix 1B: Descriptive statistics

	BDP	BGDP	BM	BPC	INF	RER	RGDP	RLR
Mean	2.469	2.329	3.070	3.226	3.161	-3.720	10.008	1.932
Median	2.558	2.459	3.117	3.254	3.207	-3.363	9.887	7.7950
Maximum	3.065	3.227	3.529	3.671	4.811	0.413	10.979	23.400
Minimum	1.508	1.357	2.425	2.796	1.108	-9.191	9.493	-48.040
Std. Dev.	0.432	0.654	0.295	0.222	0.785	3.223	0.426	19.453
Skewness	-0.681	0.028	-0.428	-0.003	0.137	-0.305	0.664	-1.185
Kurtosis	2.455	1.422	2.271	2.126	3.083	1.727	2.194	3.637
Jarque-Bera	3.772	4.361	2.212	1.334	0.145	3.485	4.228	10.552
Probability	0.152	0.113	0.331	0.513	0.929	0.175	0.120	0.005
Sum	103.720	97.844	128.947	135.532	132.792	-156.260	420.341	81.180
Sum Sq. Dev.	7.682	17.545	3.578	2.032	25.329	425.979	7.471	15515.55
Observations	42	42	42	42	42	42	42	42

Notes: BPC = bank credit to the private sector as a percentage of GDP; INF = rate of inflation; RER = real exchange rate; RGDP = real gross domestic product; RLR = real lending rate; BM=broad money supply as a percentage of GDP; BGDP = bank asset as a percentage of GDP; BDP = bank deposit as a percentage of GDP. All the variables are in logs except RLR.